

Sep 13-8:11 AM

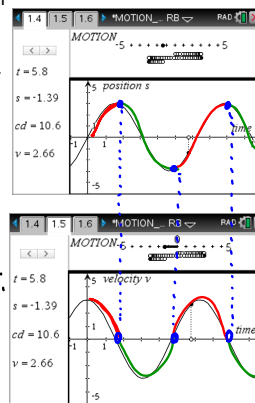
3.4a Position, Velocity, Acceleration

How is the position of the particle related to the graph? when is it:

right of origin: y pos
 left of origin: y neg
 moving right: slope pos
 moving left: slope neg
 at rest? slope zero

How is the velocity of the particle related to the graph? when is it:

moving right y pos
 moving left y neg
 at rest $y = 0$



Sep 19-6:54 PM

position $s(t)$

velocity $v(t) = s'(t)$

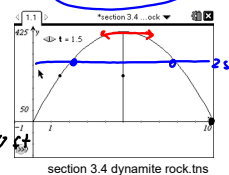
speed $= |v|$

acceleration $a(t) = v'(t) = s''(t)$

Sep 19-9:20 PM

Ex 4 p130 A dynamite blast propels a heavy rock straight up with a launch velocity of 160 ft/sec. It reaches a height of $s = 160t - 16t^2$ after t seconds.

Find a) max height, b) velocity and speed when height=256 c) acceleration d) hang time



a) $v = 0 = 160 - 32t$, $t = 5$

$s(5) = 160 \cdot 5 - 16 \cdot 5^2 = 400$

b) solve $s = 256 = 160t - 16t^2$, $t = 2, 8$

$v(2) = 160 - 32(2) = 96 \frac{\text{ft}}{\text{sec}}$ $v(8) = -96 \frac{\text{ft}}{\text{sec}}$
 speed = 96 $\frac{\text{ft}}{\text{sec}}$ speed = 96 $\frac{\text{ft}}{\text{sec}}$

c) $a = -32 \frac{\text{ft}}{\text{sec}^2}$

d) $s(t) = 0 = 160t - 16t^2$ $t = 0, t = 10$
 use solve

Sep 19-9:24 PM

Ex 5 p131

A particle moves along a line so that its position at any time $t \geq 0$ is given by the function $s(t) = t^2 - 4t + 3$.

a) find the displacement during the first 2 seconds

$$s(2) - s(0) = (2^2 - 4 \cdot 2 + 3) - (0^2 - 4 \cdot 0 + 3) = -4$$

b) find the average velocity during the first 4 seconds

$$\frac{s(4) - s(0)}{4 - 0} = \frac{3 - 3}{4 - 0} = 0$$

c) find the instantaneous velocity when $t=4$

$$v(4) = 2t - 4 \Big|_{t=4} = 4$$

d) find the acceleration when $t=4$

$$a(4) = 2$$

e) describe the motion of the particle

right $t > 2$
 left $t < 2$
 ✓ at rest $t = 2$

$$V = 2t - 4$$

$$\begin{array}{c} - - 0 + + \\ \hline 2 \end{array}$$

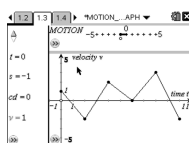
f) use parametric graphing to view the motion of the particle

Sep 19-9:34 PM

Sep 19-9:44 PM

position from velocity

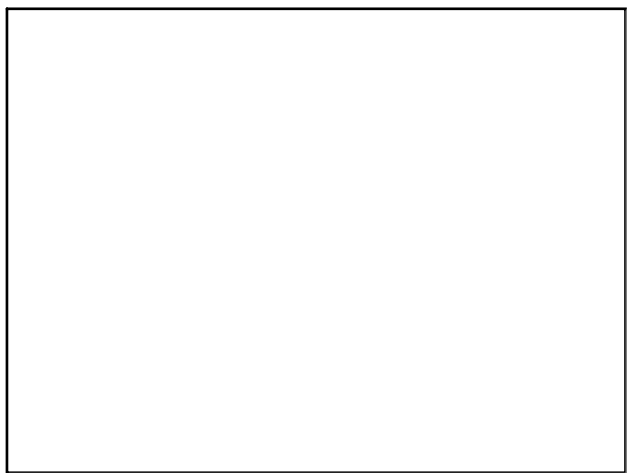
A particle moves along a horizontal line. The graphs shows its velocity. Describe the motion of the particle.



slow mo

Sep 19-9:46 PM

Sep 19-10:11 PM



Sep 13-8:20 AM